CLAIMS:

1. A method for measuring or identifying one or more component of interest in an animal or animal tissue, said method comprising the steps of:

positioning a fibre within said animal or tissue, said fibre being at least partially coated with an extraction phase for adsorbing said one or more component of interest from said animal or tissue, said extraction phase being positioned within said animal or tissue;

adsorbing said one or more component of interest onto the extraction phase for a pre-determined period of time;

removing the fibre from said animal or tissue; and

desorbing said one or more component of interest from the extraction phase into an analytical instrument for measurement or identification.

2. The method of claim 1, wherein said extraction phase specifically adsorbs said one or more component of interest.

3. The method of claim 1 or 2, wherein said extraction phase is located at a terminal end of said fibre.

4. The method of any one of claims 1 to 3, wherein said period of time is equivalent to equilibration time for a component of interest.

5. The method of any one of claims 1 to 3, wherein said period of time is less than equilibration time for a component of interest.

6. The method of any one of claims 1 to 5, wherein said one or more component of interest is selected from the group consisting of bacteria, viruses, sub-cellular components, biopolymers, DNA, proteins, drugs, drug metabolites, hormones, vitamins, environmental contaminants, chemicals, and cells.

7. The method of any one of claims 1 to 6, wherein said animal is selected from the group consisting of single cell animals, live eggs, mice, rats, rabbits, dogs, sheep, pigs, monkeys and humans.

8. The method of any one of claims 1 to 6, wherein said animal tissue is selected from the group consisting of isolated cells and organs.

9 The method of any one of claims 1 to 7, wherein said fibre is positioned within a blood vessel, and wherein said one or more component of interest is adsorbed from blood flowing through said blood vessel.

10. The method of claim 9, wherein the step of positioning said fibre comprises guiding the fibre into position within the blood vessel using a catheter.

11. The method of any one of claims 1 to 4, wherein said fibre is positioned within:

a) muscle, brain, soft tissue, or organ of said animal; and said one or more component of interest is adsorbed from interstitial fluid or intracellular fluid;

b) an inner part of spine, scull or bone; and said component of interest is adsorbed from the bone, inner fluids including spinal fluid, bone marrow or brain fluid; or

c) a cell of an animal, and an adsorbed component is extracted from the inner cellular fluid or sub-cellular component of a single cell of an animal.

12. The method of claim 1 wherein said fibre during positioning is disposed within a housing having a sealed penetrating end, said method including the step of opening the penetrating end once said fibre is positioned within the animal, exposing the extraction phase within said animal.

13. The method according to any one of claims 1 to 11, wherein said fibre is inactive during said positioning followed by activating the extraction phase using change of electrical potential or optical means to allow adsorption of said component of interest.

14. The method according to any one of claims 1 to13, wherein said fibre comprises a plurality of fibres arranged as an array or bundle, said fibres being disposed in a single position within said animal.

15. The method of any one of claims 1 to 13, wherein said fibre comprises a plurality of fibres arranged as an array or bundle, said fibres being disposed in more than one position within said animal.

16. The method of any one of claims 1 to 15, wherein the extraction phase additionally comprises a strongly bound calibrant which is retained in the extraction phase during said step of adsorbing.

17. The method of any one of claims 1 to 15, wherein the extraction phase additionally comprises a weakly bound calibrant which is released from the extraction phase during the step of adsorbing according to convection conditions and diffusion coefficient.

18. The method of any one of claims 1 to 17, wherein a strongly bound reagent is added to said extraction phase prior to extraction, which strongly bound reagent reacts with said component of interest.

19. The method as claimed in claim 18, wherein said strongly bound reagent labels the component of interest with a fluorescence tag.

20. The method of claim 18, wherein said reagent is an enzyme and the component of interest is a substrate for the enzyme.

21. The method of claim 20, wherein the substrate is a protein and the enzyme digests the protein directly onto the fibre.

22. The method of claim 20, wherein the reagent is trypsin or a trypsin cofactor.

23. The method of any one of claims 1 to 17, wherein a reagent is added to the extraction phase after the step of adsorbing, which reagent reacts with the component of interest.

24. The method of claim 23, wherein said reagent is added by spraying or dipping the reagent onto the extraction phase.

25. The method of claim 23 or 24, wherein the reagent labels the compound of interest with a fluorescence tag.

26. The method of claim 23 or 24, wherein the reagent is an enzyme and the component of interest is a substrate for the enzyme.

27. The method of claim 26, wherein the reagent is trypsin, the component of interest is a protein, and the protein is digested on the extraction phase.

28. The method of claim 23 or 24, wherein the components of interest are DNA or DNA fragments, the fibre is subject to periodic cycles of alternating cooling and heating, the reagent comprises polymerase and nucleic acids, and the method results in a polymerase chain reaction (PCR) on the extraction phase.

29. The method of any one of claims 18, 23 and 24, wherein said reagent comprises an ionization matrix utilized in matrix assisted laser desorption and ionization (MALDI).

30. The method of claim 29, including the step of positioning the fibre in analytical instrument after the step of adsorbing to allow the laser irradiation of the fibre to desorb the component of interest from the extraction phase into the analytical instrument.

31. The method of claim 30, wherein said fibre is irradiated in a region not coated with the extraction phase.

32. The method of claim 30, wherein said fibre comprises a plurality of optical fibers.

33. The method of claim 30 wherein said analytical instrument is a spectrometer selected from the group consisting of a time of flight instrument mass spectrometer (TOFMS) and an ion mobility spectrometer.

34. The method of any one of claims 1 to 28, additionally comprising the step of introducing said fibre directly into a mass spectrometer prior to the step of desorbing.

35. The method of claim 34, wherein said step of introducing the fibre into a mass spectrometer comprises insertion into a small solvent volume in a nanospray needle, followed by the step of desorbing, and electrospray of a desorbed component of interest.

36. The method of claim 34, wherein after removing the fibre from the animal or tissue, exposing the fibre to a high voltage resulting in field desorption of the component of interest directly from the extraction phase into the mass spectrometer.

37. The method of any one of claims 1 to 28, wherein said step of desorbing comprises separation of the component of interest from the extraction phase, and measurement or identification of the component in an analytical instrument selected from the group consisting of a gas chromatograph, a liquid chromatograph, a capillary electrophoresis instrument, a capillary electrochromatography instrument and a microfluidic device.

38. The method of claim 37, wherein said separation occurs directly in a separation capillary or channel of the analytical instrument.

39. The method of any one of claims 1 to 28, wherein the step of desorbing is conducted in a small bore cartridge filled with a desorption solvent following by automated measurement or identification of a component of interest in the analytical instrument.

40. The method of claim 39, wherein said fibre is placed in the small bore cartridge immediately following the step of removing the fibre from the animal or tissue, and the cartridge is then sealed prior to automated measurement or identification.

41. The method of any one of claims 1 to 40 for use in pharmacokinetic studies.

42. A device for adsorbing one or more component of interest from an animal or animal tissue, said device comprising:

one or more fibre having an at least partially coated end, said end being at least partially coated with an extraction phase for absorbing one or more component of interest; and

a positioning device for guiding the at least partially coated end of said fibre into position within the animal or animal tissue.

43. The device of claim 42, wherein said fibre diameter is of millimeter to nanometer dimensions.

44. The device of claim 42 or 43, wherein said fibre comprises a material selected from the group consisting of fused silica, plastic, carbon and metal wire.

45. The device of claim 44, wherein said fibre comprises a plurality of optical fibres formed from fused silica.

46. The device of claim 42, wherein said fibre comprises a hollow tubing having the extraction phase coated on an inside surface of the tubing.

47. The device of claim 46, additionally comprising a pump in communication with the tubing to draw up or eject a sample from the tubing.

48. The device of claim 42, wherein said fibre is a hollow tubing having the extraction phase coated on an outside surface thereof, said tubing being sealed at one end and having

a pump in communication with the tubing to blow fluid into the tubing, thereby expending the tubing and increasing the surface area of the extraction phase.

49. The device of claim 48, wherein said fluid is a gas.

50. The device of claim 42, additionally comprising a sheath surrounding said fibre for protection and easy handling.

51. The device of any one of claims 42 to 50 wherein said extraction phase is biocompatible.

52. The device of any one of claims 42-51 wherein said fibre is additionally at least partially coated with a biocompatible protection layer.

53. The device of claim 52, wherein said biocompatible protection layer surrounds said extraction phase.

54. The device of claim 52 or 53, wherein said biocompatible protection layer comprises polypyrrole or derivatised cellulose.

55. The device of claim in claim 52 or 53, wherein said extraction phase comprises a polymeric composition selected from the group consisting of substituted or unsubstituted poly (dimethylsiloxane), polyacrylate, poly (ethylene glycol) and polypyrrole.

56. The device of claim 52 or 53, wherein said extraction phase comprises a bioaffinity agent on the surface thereof, said bioaffinity agent being selected from the group consisting of a selective cavity, a molecular recognition moiety, a molecularly imprinted polymer, and an immobilized antibody.

57. The device of any one of claims 42-54, wherein:

the extraction phase comprises a polymeric composition selected from the group consisting of substituted or unsubstituted poly (dimethylsiloxane), polyacrylate, poly (ethylene glycol) and polypyrrole; and

the extraction phase additionally comprises a bioaffinity agent on the surface thereof, said bioaffinity agent being selected from the group consisting of a selective cavity, a molecular recognition moiety, a molecularly imprinted polymer, and an immobilized antibody.

58. The device of any one of claims 42-57, wherein said extraction phase is an extraction and ionization matrix for MALDI-TOFMS analysis.

59. The device of any one of claims 42-58, wherein said extraction phase contains a calibrant molecule.

60. The device of any one of claims 42-59, wherein said extraction phase contains a strongly bound reagent.

61. The device of claim 60, wherein said reagent is selected from the group consisting of a fluorescence labeling moieties and enzymes.

62. The device of claim 61, wherein said reagent comprises an enzyme selected from the group consisting of trypsin and polymerase.

63. The device of any one of claims 42-62, wherein said fibre is contained in a housing closed at one end, for opening and exposing the fibre when appropriately positioned within the animal or animal tissue.

64. The device of claim 63, wherein said housing is a tube closed at one end by means of a sealed leaf structure.

65. The device of any one of claims 42 to 64, wherein said positioning device comprises a catheter.

66. The device of any one of claims 42 to 64, wherein said positioning device comprises an x-y-z micro positioning stage.

67. The device of any one of claims 42 to 66, wherein said fibre comprises a plurality of fibres for positioning in more than one part of an animal or animal tissue.

68. The device of claim 67, wherein said plurality of fibres have the same extraction phase coated thereon.

69. The device of claim 67, wherein at least two of said plurality of fibres have a different extraction phase coated thereon.

70. The device of claim 69, wherein said at least two of said plurality of fibres have an extraction phase specific for adsorbing a different component of interest.

71. The device of any one of claims 42-70, wherein said positioning device comprises an automated system.

72. The device of claim 71, wherein said automated system is attachable to the animal or animal tissue.

73. The device of any one of claims 42 to 72, wherein said positioning device is additionally used to position said fibre within an analytical instrument for desorption of the component of interest from the extraction phase.

74. The device of any one of claims 42 to 72, wherein said positioning device is additionally used to place the fibre directly inside a separation capillary or channel.

75. The device of any one of claims 42 to 72, wherein said positioning device is additionally used to couple the fibre to a laser beam facilitating desorption of a component of interest from the extraction phase.

76. The device of claim 75, wherein said positioning device facilitates desorption of a component of interest into an analytical instrument.

77. The device as claimed in claim 42, additionally comprising an agitator to cause movement of the at least partially coated end of the fibre.

78. The device as claimed in claim 77, wherein said agitator causes is axial or horizontal movement of the fibre.

79. The device of claim 77, wherein said fibre comprises hollow tubing having the extraction phase coated on an inside surface of the tubing, and said agitator forces the tubing to draw up a sample into the tubing.

80. The device of claim 79, wherein said agitator creates a pressure differential forcing the tubing to draw up a sample into the tubing.

81. The device of claim 77, wherein said agitator comprises an inflatable balloon.

82. The device of any one of claims 42 to 81, wherein said device is used for pharmacokinetic studies.

83. A method for measuring or identifying one or more component of interest in an animal or tissue, said method comprising the steps of:

positioning the device according to claim 42 into an animal or animal tissue,

adsorbing said one or more component of interest onto the extraction phase of said device for a pre-determined period of time,

removing the device from said animal or tissue; and

desorbing said one or more component of interest from said extraction phase into an analytical instrument for measurement or identification.

84. The method of claim 83, wherein said fibre is an optical fibre and the method is performed directly in a living animal.

85. The method of claim 83, additionally comprising the step of delivering a selected compound to said animal or tissue by including said selected compound weakly bound to said extraction phase.

86. The method of claim 85, wherein after the pre-determined period of time, the extraction phase is introduced into an analytical instrument for desorption of the remaining selected compound for measurement.

87. The method of claim 85, wherein after the pre-determined period of time, the extraction phase is introduced into an analytical instrument for desorption of metabolites of said selected compound for measurement or identification.

88. The method of claim 83, wherein said fibre during positioning is protected by a housing closed at one end, and subsequently opening said housing to expose the fibre within the animal or animal tissue.

89. The method of claim 83, additionally comprising the step of agitating said fibre within said animal or animal tissue.

90. The method of claim 89, wherein the step of agitating comprises causing axial or horizontal movement of the fibre.

91. The method of claim 89, wherein the step of agitating comprises forcing the sample into a hollow fibre by pressure differential.

92. The method of any one of claims 83 to 91 for use in pharmacokinetic studies.

93. A method of measuring or identifying one or more component of interest in liquid samples arranged in a plurality of wells in a multiwell plate, said method comprising the following steps:

simultaneously submerging a distal end of a plurality of fibres within said plurality of wells, respectively, the distal end of each fibre being at least partially coated with an extraction phase for adsorbing the component of interest from the liquid sample;

adsorbing the component of interest onto the extraction phase for a pre-determined period of time;

removing the fibres simultaneously from the wells; and

positioning the extraction phase into an analytical instrument for desorption, and measurement or identification of the component of interest.

94. The method of claim 93 wherein said analytical instrument is selected from the group consisting of a MALDI analytical instrument and a multichannel micromachined microfuidic device.

95. A device for measuring or identifying one or more component of interest from liquid samples arranged in a plurality of wells in a multiwell plate, for use with the method of claim 93, said device comprising:

a plurality of fibres, each having an at least partially coated distal end, said end being at least partially coated with an extraction phase for absorbing the component of interest; and

a positioning device for guiding the coated distal end of said fibres into a submerged position within the plurality of wells of the multiwell plate, for removing said fibres from said wells, and for positioning said fibres into an analytical instrument.